

ABSTRACT OF THE DISCLOSURE

The present invention provides a method of producing a high permeability grain oriented electrical steel having excellent mechanical and magnetic properties. A hot band having a thickness of about 1.5 to about 4.0 mm has a chemistry comprising about 2.5 to about 4.5% silicon, about 0.1 to about 1.2% chromium, about 0.02 to about 0.08% carbon, about 0.01 to about 0.05% aluminum, up to about 0.1% sulfur, up to about 0.14% selenium, about 0.03 to about 0.15% manganese, up to about 0.2% tin, up to about 1% copper, and balance being essentially iron and residual elements, all percentages by weight. The band has a volume resistivity of at least about $45 \mu\Omega\text{-cm}$, an austenite volume fraction ($\gamma_{1150^\circ\text{C}}$) of at least 20% and the strip has an isomorphic layer thickness of at least about 2% of the total thickness on at least one surface of the hot processed band. The band is rapidly cooled after the anneal prior to cold rolling at a rate of at least 30°C/second from $875 - 950^\circ\text{C}$ to a temperature below 400°C . The band is cold reduced in one or more stages with a final reduction of at least 80%, annealed, decarburized and coated with an annealing separator on at least one side. A final annealing provides stable secondary grain growth and a permeability measured at 796 A/m of at least 1840.